The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A device, comprising:

a substrate having a cavity extending from at least one surface of the substrate;

a cathode having an electron-emitting coating disposed thereon, wherein the cathode is suspended near the opening of the cavity in the substrate;

an anode constructed of an electrically conductive material, wherein the anode is configured to receive electrons emitted by the cathode, and wherein the anode is configured to produce an electrical current from the received electrons, wherein the anode is configured to communicate the electrical current to an external circuit;

a grid forming at least one aperture configured for allowing the passage of electrons therethrough, wherein the grid is constructed of an electrically conductive material, and wherein the grid is positioned between the cathode and anode;

a seal for creating a controlled environment in an area surrounding the anode, cathode, and grid; and

a circuit configured for heating the cathode.

2. The device of Claim 1 further comprising, at least one control circuit for selectively supplying a voltage to the grid to control the magnitude of the flow of electrons through the aperture of the grid, thereby controlling the electrical current received by the anode.

3. The device of Claim 1, wherein the grid comprises a plurality of elongated conductive strips, wherein the plurality of elongated conductive strips are substantially parallel to one another, and wherein the aperture of the grid is formed by the spacing between the plurality of elongated conductive strips.

4. The device of Claim 3, wherein the plurality of elongated conductive strips are mounted on a raised support formed on the substrate.

5. The device of Claim 4, wherein the raised support is formed by a stacked structure.

6. The device of Claim 1, wherein the cathode is affixed to the substrate at opposite ends of the cathode, and wherein a substantial portion of the cathode is suspended over the cavity of the substrate, thereby forming an air gap between the cathode and substrate.

7. The device of Claim 1, wherein the electron emitting coating is made of a low work function material.

8. The device of Claim 1, wherein the electron emitting coating is made of a BaSrCa tricarbonate.

9. The device of Claim 1, wherein the electron emitting coating includes BaSr.

10. The device of Claim 1, wherein the electron emitting coating includes BaSrAl.

11. The device of Claim 1, wherein the electron emitting coating includes thoriated tugsten.

12. The device of Claim 1, wherein the electron emitting coating includes scandia.

13. The device of Claim 1, wherein the electron emitting coating includes scandate.

14. The device of Claim 1, wherein the electron emitting coating includes cesium.

15. The device of Claim 1, wherein the grid is made of material selected from the group consisting of tungsten, gold, nickel, carbon, silver, and copper.

16. The device of Claim 1, wherein the grid is made of material selected from the group consisting of molybdenum and tantalum.

17. The device of Claim 1, wherein the grid contains a carbon-containing material.

18. The device of Claim 1, wherein the grid contains a silicide.

19. The device of Claim 1, wherein the controlled environment surrounding the grid, cathode, and anode has a vacuum drawn therein.

20. The device of Claim 1, wherein the controlled environment is an enclosed area filled with a gas selected from the group consisting of hydrogen, helium, krypton, argon, and mercury.

21. A device, comprising:

a substrate having a cavity extending from at least one surface of the substrate;

a first member having an electron-emitting coating disposed on the first member, wherein the first member is suspended near the opening of the cavity in the substrate;

a second member constructed of an electrically conductive material, wherein the second member is configured to receive electrons emitted by the first member, and wherein the second member is configured to produce an electrical current for an external circuit from the received electrons;

a first grid forming at least one aperture configured for allowing the passage of electrons therethrough, wherein the first grid is constructed of an electrically conductive material, wherein the first grid is positioned between the first and second member;

a second grid forming at least one aperture configured for allowing the passage of electrons therethrough, wherein the second grid is constructed of an electrically conductive material, wherein the second grid is positioned between the first and second member;

a seal for creating a controlled environment in an area surrounding the first and second grid and the first and second member; and

a circuit configured for heating the first member.

22. The device of Claim 21, further comprising, at least one control circuit for selectively supplying a voltage to the first and second grid to control the magnitude of the flow of electrons through the aperture of the grid, thereby controlling the electrical current received by the second member.

23. The device of Claim 21, wherein the aperture of the first and second grids are aligned.

24. The device of Claim 21, wherein the second grid is electrically connected to a ground source.

25. The device of Claim 21, wherein the each elongated conductive strip is mounted on a raised support formed on the substrate.

26. The device of Claim 21, wherein the first member is affixed to the substrate at opposite ends of the first member, and wherein a substantial portion of the first member is suspended over the cavity of the substrate, thereby forming an air gap between the first member and substrate.

27. The device of Claim 21, wherein the first and second grids are made of material selected from the group consisting of tungsten, gold, and tantalum.

28. The device of Claim 21, wherein the controlled environment is an enclosed area surrounding the grid, cathode, and anode, wherein the enclosed area has a vacuum drawn therein.

29. The device of Claim 21, wherein the controlled environment is an enclosed area filled with a gas selected from the group consisting of hydrogen, helium, argon, and mercury.

30. A device, comprising:

a substrate having a cavity extending from at least one surface of the substrate;

a first member having an electron-emitting coating disposed on the first member, wherein the first member is suspended near the opening of the cavity in or above the substrate;

a second member constructed of an electrically conductive material, wherein the second member is configured to receive electrons emitted by the first member, and wherein the second member is configured to produce an electrical current for an external circuit from the received electrons;

a first grid forming at least one aperture configured for allowing the passage of electrons therethrough, wherein the first grid is constructed of an electrically conductive material, wherein the first grid is positioned between the first and second member;

a second grid forming at least one aperture configured for allowing the passage of electrons therethrough, wherein the second grid is constructed of an electrically conductive material, wherein the second grid is positioned between the first and second member;

a third grid forming at least one aperture configured for allowing the passage of electrons therethrough, wherein the second grid is constructed of an electrically conductive material, wherein the third grid is positioned between the first and second member;

a seal for creating a controlled environment in an area surrounding the first, second, and third grid, and the first and second member; and

a circuit configured for heating the first member.

31. The device of Claim 30, further comprising, at least one control circuit for selectively supplying a voltage to the first, second and third grid to control the magnitude of the flow of electrons through the aperture of the grid, thereby controlling the electrical current received by the second member.

32. The device of Claim 30, wherein the aperture of the first and second grids are aligned.

33. The device of Claim 30, wherein the second grid is electrically connected to a ground source.

34. The device of Claim 30, wherein the each elongated conductive strip is mounted on a raised support formed on the substrate.

35. The device of Claim 30, wherein the first member is affixed to the substrate at opposite ends of the first member, and wherein a substantial portion of the first member is suspended over the cavity of the substrate, thereby forming an air gap between the first member and substrate.

36. The device of Claim 30, wherein the first and second grids are made of material selected from the group consisting of tungsten, gold, and tantalum.

37. The device of Claim 30, wherein the controlled environment is an enclosed area surrounding the grid, cathode, and anode, wherein the enclosed area has a vacuum drawn therein.

38. The device of Claim 30, wherein the controlled environment is an enclosed area filled with a gas selected from the group consisting of hydrogen, helium, argon, and mercury.

39. A device, comprising:

a substrate having a cavity extending from at least one surface of the substrate;

a first member having electron emitting properties, wherein the first member is suspended near the opening of the cavity of the substrate;

a second member constructed of an electrically conductive material, wherein the second member is positioned over the cavity of the substrate, wherein the second member is configured to receive electrons emitted by the first member, and wherein the second member is configured to produce an electrical current to an external source from the received electrons;

a seal for creating a controlled environment in an area surrounding the first and second member; and

a circuit configured for heating the first member.

40. The device of Claim 39, wherein the controlled environment is an enclosed area surrounding the cathode and anode, wherein the enclosed area has a vacuum drawn therein.

41. The device of Claim 39, wherein the controlled environment is an enclosed area filled with a gas selected from the group consisting of hydrogen, helium, argon, and mercury.

42. A method of manufacturing a device, wherein the method comprises:

forming a substrate having at least one substantially flat surface, wherein the formation of the substrate creates at least two raised supports each having a top surface of sufficient size to hold a conductive material applied thereon;

applying a first conductive layer on the top surface of the formed substrate, wherein the application of the first conductive layer includes the application of a conductive layer capable of providing heat when a control voltage is applied thereto;

etching a cavity in the substrate, wherein the etching process creates an air bridge structure positioned between the supports;

forming a second conductive layer on the top of the supports;

affixing a third conductive layer that is vertically positioned above the first and second conductive layers, wherein the third conductive layer is affixed in a

location that allows the third conductive layer to receive electrons from the first conductive layer; and

forming a controlled environment in an area surrounding the first, second and third conductive layers.

43. The method of Claim 42, wherein the method further comprises:

applying an insulating layer on the second conductive layer, wherein the insulating layer is vertically positioned over the second conductive layer;

forming a fifth conductive layer over the insulating layer, wherein the formation of the fifth conductive layer involves forming a conductive material that is vertically positioned over the second conductive layer and insulating layer.

44. A device, comprising:

a substrate means having a cavity that extends into the substrate;

a cathode means having an electron-emitting coating disposed thereon, wherein the cathode means is suspended near the opening of the cavity in the substrate;

an anode means constructed of an electrically conductive material, wherein the anode means is configured to receive electrons emitted by the cathode means, and wherein the anode means is configured to produce an electrical current from the received electrons, wherein the anode means is configured to communicate the electrical current to an external circuit;

a grid means forming at least one aperture configured for allowing the passage of electrons therethrough, wherein the grid means is constructed of an electrically conductive material, and wherein the grid means is positioned between the anode means and cathode means;

a seal for creating a controlled environment in an area surrounding the anode means, cathode means, and grid means; and

a circuit configured for heating the cathode means.

45. The device of Claim 44, further comprising, at least one control circuit for selectively supplying a voltage to the grid means to control the magnitude of the flow of electrons through the aperture of the grid means, thereby controlling the electrical current received by the anode means.